subdue. They have decreed a law for the *reformation* of the national *ateliers* by the substitution of *Task work* for nominal day labour, and by the dispersion of provincial workmen; but they do not appear to contemplate the possibility of doing more, in the meantime at least, than merely re-organizing them, purging them of many idlers who have other resources, and thus reducing their numbers in Paris to about 90,000.* The Minister of Public Works is said to be preparing more detailed plans by which constant employment would be secured to this goodly number, and a sub-committee has been appointed to bring about a friendly arrangement between the masters of several branches of industry and their workmen. The Minister of Agriculture and Commerce has announced a Bill for the creation of fifty agricultural colonies *mobiles*, for undertaking, on a grand scale, works of irrigation and draining in different parts of the territory. The real workmen themselves, it is said, approve of all that is being done; but the idlers, the gamins, the paupers, the convicts and other thieves amongst them, of course deny the propriety of any thing likely to compel them to live upon the fruits of their own actual labour. They have made a handle, too, of the dismissal of their chief, leader, or 'father,' as they call him, namely, M. Emile Thomas,—a young man of five-and-twenty, whom the Government have seen fit to remove from his post, and send off to Bourdeaux on rather an equivocal 'mission.'† A general strike of the people employed on the railways was lately forming a new cause of anxiety at Paris. The Directors, however, backed by the Government, determined not to submit to the unreasonable demands of the engineers and firemen, who are bent on the discharge of all the remaining English workmen employed, and they meant to adopt the most energetic measures to defeat a personal attack threatened against the Englishmen employed on the Rouen railway.

THE DRAINAGE QUESTION.

DRAINAGE IN MANCHESTER, LIVERPOOL, AND CHESTER.

Sir,—The absorbing topic of the day is sanitary remedies, and it appears, now their importance becomes better understood, that towns are vieing with each other in carrying them into effect, so far as their means will allow.

The expense attending efficient sanitary arrangements will be the greatest obstacle to their extension; and when it is known that it will require at least fifty millions of money to carry them out, so far as the public purse is concerned, and an equal sum for the owners and occupiers of property for private sanitary arrangements, in Great Britain alone, we cannot wonder that the progress is slow, and that considerable opposition is thrown in the way.

This result has been obtained from approximate estimates and data from various towns.

In Manchester, a *radical* "change has come over the spirit of their dream." Sewers of brickwork are to be abandoned, and tubes, composed of fire clay, adopted in their stead. The sizes and relative cost of the two systems are as follow:—

TUBES.

Inches.	Cost.			
25×18	£0	8	0	per yard linear.
20×15	0	6	6	,,
16×12	0	3	9	,,
12× 9	0	2	0	,,
8× 6	0	1	4	,,
6× 4	0	1	0	,,
4× 2½				

Exclusive of excavation and setting.

OLD SEWERS.

Inches.	Cost.			
72×38	£2	0	0	per yard linear.
60×36	1	15	0	,,
42×24	0	17	3	,,
36×24	0	15	4	,,
33×22	0	14	0	,,
30×20	0	14	0	,,
24×18	0	13	4	,,
20×15	0	12	6	,,
15×12	0	8	3	,,

Excavation included.

Thus, it appears the area of the tubes is about one-sixth of the area of the old sewers.

Manchester has groundlessly set up a claim as the inventor of the egg-shaped tube for the purposes of drainage, and the terra-cotta syphon trap, notwithstanding the former was suggested in the Sanitary Report of 1844, page 363, and the latter in your journal for 1844, page 594; and it appears they were not introduced into Manchester until 1847. The invert of the Manchester tubular sewer is of the shape of a Gothic arch inverted, and, I understand, the *exterior* surface is glazed.

Before tubes can be generally introduced for the purposes of drainage, manufacturers must considerably reduce their prices, as I find sewers can be constructed of brickwork at a cheaper rate, even of one-third larger area. I cannot see the great objection to sewers composed of brickwork, provided there is no waste of material, and they are properly and substantially constructed — viz., with good radiated bricks set in cement or lias lime; for, when a good fall can be obtained, and a system of flushing adopted. I quite agree with Mr. Austin, in the Sanitary Report, "that, in such situations, all difficulty ceases." Again, tubes have not yet been manufactured larger than 25×18 inches. This is of sufficient size to drain only small areas; but main sewers to drain large areas must still be composed of brickwork or moulded blocks: the latter are the most costly. In Liverpool slow progress is made in the extension of their sewers; for, notwithstanding their great wealth, a difficulty is experienced, in these times of monetary depression, in procuring the "sinews of war," while they have ample powers, under an Act recently obtained, to carry out, to its fullest extent, sanitary remedies, and a large engineering staff, costing from 7,000*l.* to 8,000*l.* per annum.

In Liverpool, tubes are used for house drainage and the drainage of courts, and I understand it is intended to drain one of the smaller streets with glazed tubes. The sewers of the larger size are composed of brickwork, and in shape very much resemble those of Mr. Roe, in the Holborn district. The corporation of Liverpool having the water-works in their own hands, have now the means of flushing the sewers, whenever required, economically, though, I apprehend, a supply of water for that purpose might be obtained, at a cheaper rate, from the river Mersey, more particularly as it is stated there is deficiency of water now for domestic purposes. An interesting controversy is now going on relative to the better supply of Liverpool with water. The Rivington Pike scheme is condemned, and it is maintained that a sufficient supply can be obtained from the strata of the new red sandstone upon which Liverpool is founded. Another scheme is to obtain a supply from Bale lake; but I should conceive that a plentiful supply of water for Liverpool and other towns situated on the route, might be obtained from the river Dee, without ascending so high as Bale lake, and at much less cost. The street traps in use at Liverpool are the old valve trap, and Burton's registered trap: the syphon trap has not yet been introduced.

It has been recommended in the pages of the *Civil Engineers' Journal*, to erect large chimney shafts at elevated points, connected by tunnels with sewers, and the sewers with the flues of houses and factories, so as to afford a passage for smoke and offensive effluvia, and at the same time be the means of supplying pure air to the streets, courts, and houses. The principle of the plan is not new, as at some of the copper works in the manufacturing districts of South Wales subterranean shafts or tunnels are used for the purpose of collecting and conveying away the smoke and vitriolic fumes to the summit of the adjacent mountain, where it is dispersed in the atmosphere; this is the means of preventing considerable injury to vegetation that would otherwise take place, which travellers between Neath and Swansea cannot fail to have observed.

Birkenhead being comparatively a modern built town, more attention has been paid to the subject of sewage than in most other places; the sewers there are of an area equal in magnitude and strength equivalent to some of the London sewers, and, as a natural inference, must be quite as costly. In some instances, when rock has been found, the inverts of the sewers have been formed in it, and the arches only turned in brickwork. House drainage, I understand, is very deficient. Sanitary remedies have received a check in this town for the want of funds; the authorities, in evincing a spirit of economy, have recently reduced their staff of officers.

In Warrington, I understand, a sanitary survey is in course of execution, anticipatory of the Health Bill.

Chester has made considerable progress in sewages under a Sanitary Act recently obtained; the sewers are being constructed on a more economical system than that adopted in some towns, but the want of means is a great obstacle to their more rapid advancement.

Many of the old drains that were made previous to the Improvement Act coming into operation were so defective in levels, arrangement, and construction, as to render it necessary to take them up; in fact, the whole drainage of the old city nearly, required readjustment and reconstruction, founded upon a correct system of levels.

The main sewers in Chester are costing less per lineal yard, including materials and excavation, than the largest sized egg-shaped tubes advertised in your paper.

A system of flushing is adopted there in situations contiguous to the Chester and Ellesmere Canal, that Company having liberally placed at the disposal of the authorities a sufficient supply of water for that purpose. The sluices are fixed in the side walls of the canal, so that the sewers may be effectually cleansed whenever required. The sewers on the higher levels at present have not that advantage, in consequence of the supply of water being inadequate. A considerable extent of house drainage has been done; it is the practice, whenever a sewer is completed, to serve notices upon the owners of the property to drain their houses. Tubular pipes 4 inches, 6 inches, and 9 inches diameter, are used for the purpose of house drainage, and every house drain is effectually trapped. The traps in use are the syphon and the valve traps; the former have been extensively used for the last two years, and answer exceedingly well. Tubes of glazed stone ware have been introduced, also glazed junctions and syphon traps of different sizes for house drainage. These tubes are manufactured at Ruabon. Glass tubes (an excellent invention for drainage or water pipes) are being experimented upon, with the view of ascertaining their relative advantages over the pipes now in use.

An attempt was made to procure egg-shaped tubes (glazed), but it was abandoned, in consequence of the increased expenses attending them.

I cannot close this article without directing especial attention to the efforts now being made to reduce so *materially* the size of sewers for town drainage. Although no advocate for the expensive and wasteful system carried out in many towns, still I am not one of those that would recommend the other extreme to be adopted. One party advocates sewers of the tubular system of the bare minimum capacity for house drainage only, leaving rain and storm water to find vent how they can, which will occasionally cause serious inundations; another, a separate system of tubes for house drainage and rain and storm water. The former is so directly at variance with the practice of all our eminent hydraulic engineers in the construction of their river bridges, sluices, culverts, water works, &c., that it needs only to be named to be repudiated; the latter will entail a much larger expenditure even than the old system, in consequence of the high price of glazed tubes.

B. B.

LITHOGRAPHIC STONE.—Among the prizes offered by the Paris Society for the encouragement of Arts and Manufactures, is one of 1,500 fr. (60*l.*) for the discovery and practical working of new quarries of lithographic stones in France; the society being convinced that there exist in many localities of the country, places where lithographic stones may be quarried to advantage.

* The last inspection of the operatives in the national workshops fixes their number at 108,000, independent of 7,000 received on certificates from the Commissaries of Police.

† The machinery of "organized labour" appears expensive at least. The *Journal des Débats* states, that "by the removal of M. Emile Thomas from the direction of the national workshops a saving of from 25,000 to 30,000 francs (from 1,000*l.* to 1,200*l.* a day) will be effected. M. Emile Thomas retained for his service five chasseurs, four cabriolets, fourteen tilburies, a calèche, and thirty-eight horses."